REMARKS

The Official Action maintains the Claims 1-7 under 35 USC § 101 as being directed to non-statutory subject matter. Independent Claim 1 has therefore been amended to recite that at least one of the steps is performed by a computer processor as suggested by the Official Action. Since Claim 1 and, by dependency, Claims 2-7 not only produce a useful, concrete and tangible result, but are also explicitly within the technological arts, Applicants submit that the rejection under 35 USC § 101 is overcome.

The Official Action also maintains the rejection of Claims 1-4, 6, 7, 11-14, 16 and 17 under 35 USC § 102(b) as being anticipated by U.S. Patent No. 5,652,867 to James F. Barlow et al., and submits that the remainder of the claims, Claims 5, 8-10 and 15, are obvious under 35 USC § 103(a) over the Barlow '867 patent in view of Official Notice that "the use of mixed integer programs for optimization problems is old and well known in the art." Applicants submit, however, that the claimed invention is patentably distinct from the Barlow '867 patent and accordingly traverse the rejections based upon the Barlow '867 patent as set forth below. In light of the amendment to independent claim 1 and the following remarks, Applicants respectfully request reconsideration of the present application and allowance of the amended set of claims.

As described in the prior Amendment dated April 5, 2004, the Barlow '867 patent discloses a computerized airline reservation system simulator that can be used by an airline to maximize revenues. See Col. 3, lines 37-39. As shown in Figure 1, a global network is built (step 4) using the host airline and other airline information 2, which includes origin and destination information for flight services offered by the airline provider, display rules for each CRS, market share information, estimates of market size and revenues, frequency of requests for each request time, and the host airlines' share of bookings on a given CRS. The global network 4 is a worldwide database arrangement of travel services provided by travel providers in all markets of interest. See Col. 3, lines 46-59. A CRS display screen is then simulated (step 6) and analyzed to determine the screen presence of the travel provider's flight services on the network of reservation systems, which also takes into account the market size and revenue of the travel provider's services in a given market (step 8). The results are provided to the user (step 10).

The host airline information may be modified and the process repeated to provide updated results in step 10. See Col. 3, line 66 to Col. 4, line 19.

As shown in Figure 2 of the Barlow '867 patent, to build the global network, an origin-destination record containing all origin-destination data, including connecting points, for all flight services offered by airline travel providers in all markets of interest is built (step 16). Any unattractive service options then may be eliminated from the origin-destination record whenever a superior service is available (step 18). Given a particular flight service request, select options are executed to identify the potential flight services for sorting and display (step 20). See Col. 4, lines 20-45.

As shown in Figure 3 of the Barlow '867 patent, the screen simulation step determines what type of CRS to emulate and obtains the sort and display rules (step 23) for the CRS. Consumer service requests to show travel agent request activity on a CRS are also simulated (step 31). Simulation screens for individual markets and request times are created (step 34), which represent the display information obtained when service requests 31, 32 and 33 are made for the travel provider's flight services in all markets of interest throughout the global network. See Col. 4, line 46 to Col. 5, line 22.

As shown in Figure 5 of the Barlow '867 patent, the analysis begins by recreating the simulation screens created in step 34 (step 48). The information in the simulated screens is summarized to determine the airline provider's screen presence in all markets (step 50) and per individual market (step 52), which allows the determination of average screen presence throughout all markets (step 54). The screen presence of flight services on a given CRS is also calculated using the reservation system's build, edit, sort and display rules (step 56). The travel provider's revenue potential in a given market, overall market or combination of markets is also determined (step 58). See Col. 5, line 48 to Col. 6, line 3. The revenue potential is derived from market share parameters, such as market size and market revenues so as to quantify the travel provider's revenue potential if no passengers were turned away and no limits in capacity existed. See Col. 6, lines 42-46.

Thus, the Barlow '867 patent provides a CRS simulator that evaluates the screen presence of a carrier's scheduled flights on a connection-by-connection basis. The air carrier can

maximize revenues for a given flight based on the best screen presence for each connecting point of the flight, then schedule a flight service comprising the most desired connecting points as requested by customers and thereby maximize its overall revenues along the entire flight path. See Col. 2, lines 39-47.

In contrast to the disclosure of the Barlow '867 patent, the computer implemented method, system and computer program product for optimizing a schedule of legs employed by at least one service provider in transporting objects between geographic markets of the claimed invention identify a set of itineraries for serving each market in a set of markets, each itinerary comprising one or more legs. The computer implemented method, system and computer program product of the claimed invention also generate a set of market plans for each of a plurality of markets. As now recited by the amended independent claims, the set of market plans for each market comprises a plurality of market plans with each market plan including a modified set of the itineraries for the market. The profitability of each market plan is then individually determined for each market following the generation of the set of market plans for each of the plurality of markets. Finally a subset optimizing overall profit of the schedule is selected from the set of market plans for each market while also taking into account the resources of a service provider. As recited by the independent claims, this subset selection is conducted following a determination of the profitability of each market plan for each market.

As stated on page 6, lines 8-9 of the specification, a market plan is an automatically-generated list of itineraries for serving a city-pair called a market. By way of example, the method, system and computer program product of independent Claims 1, 8 and 11 initially identify the set of itineraries currently serving each market. In the case of the airline industry, the method, system and computer program product would initially identify the scheduled flights serving each market, wherein the market is defined as an origin and destination pair. The method, system and computer program product would then generate a set of modified itineraries for each of a plurality of markets. By way of example, for a market defined by an origin of Dallas-Fort Worth (DFW) and a destination of Seattle, the original set of itineraries that was identified might include a single direct flight from DFW to Seattle (herein designated "Itinerary 1"). As such, the set of market plans generated for the DFW to Seattle market could then include

other direct flights between DFW and Seattle at different times than the currently scheduled flight, as well as connecting flights, such as an itinerary that includes a flight from DFW to San Francisco and subsequently a flight from San Francisco to Seattle (herein designated "Itinerary 2") and another itinerary including a flight from DFW to Denver and a subsequent flight from Denver to Seattle (herein designated "Itinerary 3").

As recited by independent Claims 1, 8 and 11, a plurality of market plans are generated for each of a plurality of markets with each market plan consisting of a modified set of itineraries for the respective market, i.e., for the respective origin and destination. Thereafter, the profitability of each market plan is individually determined for each of the markets. Continuing with the prior example, for the DFW to Seattle market, a first market plan may elect to serve the market by offering both Itineraries 1 and 2, a second market plan may elect to serve the market by offering Itineraries 2 and 3 and a third market plan may elect to serve the market by only offering Itinerary 3. As such, the profitability of each of the first, second and third market plans would then be individually determined. As recited by independent Claims 1, 8 and 11, this individual determination of the profitability of each market plan is conducted for each market plan in each market following the generation of the set of market plans for each of the plurality of markets. In other words, the plurality of market plans for each of a plurality of markets are generated and then the profitability of each market plan in each market is individually determined.

Thereafter, a subset of markets plans is selected from among the set of market plans for each market that optimizes the overall profit of the schedule. By way of the continued example, this selection process can analyze the various markets plans, i.e., flight options, and the profitability of each market plan within each market and select zero, one or more market plans for each market, wherein the selected market plans for the various markets optimize the overall profit of the schedule. For example, this selection process may determine that the overall profit of the schedule is optimized by supplementing the currently scheduled direct flight between DFW and Seattle (Itinerary 1) with a connecting flight through San Francisco (Itinerary 2), but not by offering other direct flights between DFW and Seattle at other times and not by offering another connecting flight through Denver. Thus, for the DFW to Seattle market, Itineraries 1 and

2 would be selected, and in combination with the itineraries selected for each of the other markets, would comprise the resulting airline schedule.

As further recited by independent Claims 1, 8 and 11, the selection of the subset that optimizes the overall profit of the schedule also accounts for the resources of the service providers that provide the various legs, such as the various flights. Thus, the selection of the subset that optimizes the overall profit of the schedule takes into account the finite resources of the service providers and does not select a subset that optimizes the overall profit of the schedule but that requires more resources than possessed by the service provider. In the foregoing example, the subset optimizing the overall profit of the schedule would be selected in such a manner that no aircraft would be required to be in two places at any one time or to be in service in conjunction with two or more flights at one time. By optimizing the overall profit of the schedule subject to the constraints imposed by the resources of the service providers, the resulting schedule does not necessarily, and generally does not, include the market plan from each market that produces the largest profit since that particular subset of market plans is typically infeasible as a result of violating the constraints imposed by the resources of the service providers. However, the subset of market plans is selected in such a manner so as to optimize the overall profit subject to the constraints imposed by the resources of the service providers, such as by selecting those itineraries that are not necessarily the most profitable on an individual basis, but are the most profitable when considered in combination from among those subsets that are flyable. As is also recited by independent Claims 1, 8 and 11, the selection of the subset optimizing the overall profit of the schedule is conducted following the determination of the profitability of each market plan for each market.

By individually determining the profitability of each market plan for each market following the generation of the set of market plans for each of plurality of markets, and by thereafter selecting the subset optimizing the overall profitability of the schedule following the determination of profitability of each market plan for each market, the method, system and computer program product of the claimed invention can more efficiently analyze a wide variety of alternative schedules and arrive at an optimized schedule in terms of profitability, as opposed to more conventional incremental approaches in which a scheduled change was made and the

effect of the schedule change on profitability was evaluated, prior to considering any other scheduling changes and their respective effects upon profitability.

More particularly, the Barlow '867 patent does not teach of suggest generating a plurality of market plans for each of a plurality of markets and then subsequently individually determining the profitability of each market plan for each market, as recited by independent Claims 1, 8 and 11. Instead, the Barlow '867 patent describes the generation of a single modified market plan for each market. While each modified market plan may include multiple modifications relative to the current flight schedule as set forth in column 4, lines 15-20 of the Barlow '867 patent, only a single modified market plan is generated for each market at any one time. Based upon the computerized airline reservation system simulation of the Barlow '867 patent, the screen presence per individual market is calculated and, in turn, the average screen presence throughout all markets is determined. Based upon this average screen presence, the revenue potential attributable to the modified market plan in each market or in a combination of markets can be determined as described in column 5, line 66 – column 6, lines 3 of the Barlow '867 patent. In contrast to the claimed invention, if the technique described by the Barlow '867 patent desires to consider the impact of other modified market plans upon the profitability of the schedule, the entire process would be repeated.

By way of example in which the effect of first and second modified market plans in each market upon the profitability of the resulting schedules is to be determined, the Barlow '867 patent would suggest the generation of a first modified market plan for each market and the subsequent determination of the overall profit of the modified schedule, followed by the generation of the second modified market plan for each market followed by the determination of the revenue potential of the second modified market plan. Conversely, the method, system and computer program product of the claimed invention recites the generation of the first, second and any other market plans for each market, the subsequent determination of the profitability of each market plan on an individual basis and then the selection of the subset of market plans that optimize the overall profit of the schedule following the determination of the individual profitability of each market plan for each market. Thus, the claimed invention does not attempt to optimize the overall profit of the schedule until each market plan has been constructed and

individually analyzed to determine its profitability, while the method of the Barlow '867 patent would go to the effort of determining the revenue potential of the entire schedule for each modified market plan.

The Barlow '867 patent also fails to teach or suggest selecting from the set of market plans for each market the subset optimizing the overall profit of the schedule following the determination of the profitability of each market plan for each market, as recited by the claimed invention. Instead, as described above, the Barlow '867 patent would consider the revenue potential of a schedule comprised of a modified market plan for each market, but does not describe selecting from among a set of market plans that have been generated for each market and for which the profitability has been individually determined, as now recited by the claimed invention. Instead, to consider the impact of additional modified market plans upon the revenue potential, the overall process would be repeated in accordance with the technique described by the Barlow '867 patent, thereby potentially resulting in a somewhat less efficient process than that recited by the present invention.

Moreover, the Barlow '867 patent does not teach or suggest selecting a subset of market plans from among the set of market plans that has been generated for each market to optimize overall profit schedule "while accounting for resources of a service provider", as recited by the independent claims. In this regard, the method, system and computer program product of independent Claims 1, 8 and 11, respectively, insure that the service providers have appropriate resources to perform the subset of market plans that is selected to optimize the overall profit of the schedule, such as by having a sufficient number of aircraft in the appropriate locations to fly the modified schedule. In contrast, the Barlow '867 patent does not teach or suggest any consideration of the resources of a service provider.

From a review of the response to the prior Amendment on page 10 of the Official Action, it appears that the Examiner may have oversimplified the amendments introduced in the prior Amendment. In this regard, the prior amendments are characterized as "including amended claim language reciting that a plurality of markets and market plans are processed by the claimed invention" and then concludes that this claim language does not provide a patentable distinction relative to the Barlow '867 patent since the Barlow '867 patent "is to be used to optimize the

scheduling of travel services worldwide, in all markets of interest". Applicants concur with this assessment of the Barlow '867 patent, but submit that the claimed invention is patentably distinct from the Barlow '867 patent for the reasons described above that go far beyond the processing of a plurality of markets and market plans. In this regard, the sequence of operations is substantially different between the claimed invention and the Barlow '867 patent with the claimed invention generating a set of market plans for each market and the then individually determining the profitability of each market plan before selecting a subset of the market plans to form a schedule that is optimized for profitability subject to the constraints imposed by resource limitations of the service providers. Moreover, the claimed invention does not involve an obvious "duplication of parts/steps" as intimated by the Official Action. Instead, as described above, the claimed invention recites elements that are not disclosed by the Barlow '867 patent and performs the various operational steps in a significantly different order, thereby providing efficiencies not enjoyed by the Barlow '867 patent.

For at least the foregoing reasons, independent Claims 1, 8 and 11 are not taught or suggested by the Barlow '867 patent. Since the claims that depend therefrom include each of the recitations of a respective independent claim, the dependent claims are likewise not taught or suggested by the Barlow '867 patent, taken individually or in combination with the subject matter for which Official Notice was taken. While Applicants concur that the use of a mixed integer program for an optimization problem in general is known in the art, Applicants submit that the use of a mixed integer program for solving the optimization problem presented by independent Claims 1, 8 and 11 is not known to those skilled in the art and does provide an additional patentable distinction for the claimed invention. In this regard, Applicants submit that there is no motivation or suggestion for combining the use of a mixed integer program to solve an optimization problem with the method of the Barlow '867 patent as suggested by page 6 of the Official Action. In particular, the Barlow '867 patent does not describe an optimization problem that needs to be solved by a mixed integer program or otherwise. As described above, for example, the Barlow '867 patent does not describe the imposition of constraints upon the possible solutions as would require the solution of an optimization problem and as are imposed by the resource limitations of the service providers set forth by the claimed invention.
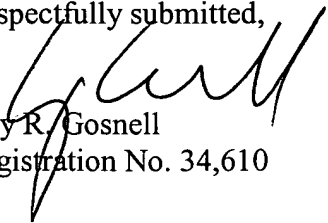
For each of the foregoing reasons, Applicants submit that the rejections of the claims under 35 USC §§102(b) and 103(a) are therefore overcome.

CONCLUSION

In view of the amendments and the remarks presented above, it is respectfully submitted that all of the present claims of the present application are in condition for immediate allowance. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicants' undersigned attorney to resolve any remaining issues in order to expedite examination of the present application.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.
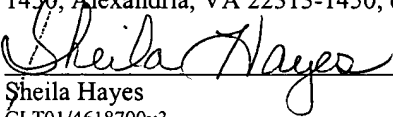
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